SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-43

Name: Whitewood Lake **County**: Kingsbury
Legal Description: T110N- R54W-Sec. 2, 3, 9-21; T110N- R53W-Sec.18-19
Location from nearest town: 3-1/2 miles south, 1/2 east of Lake Preston, SD

Dates of present survey: August 3-4, 2010
Date last surveyed: August 6-7, 2008

Managed Species	Other Species
Walleye	Black Bullhead
Yellow Perch	White Sucker
Northern Pike	
Common Carp	

PHYSICAL DATA

Surface Area: 4,677 acres
Maximum depth: 7 feet
Volume: No data
Contour map available: Yes
OHWM elevation: None set
Outlet elevation: None set
Watershed area: 106,134 acres
Mean depth: 3.8 feet
Shoreline length: 20.4 miles
Date mapped: 1990
Date set: NA
Date set: NA
Lake elevation observed during the survey: 2 feet low
Beneficial use classifications: (6) warmwater marginal fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering.

Ownership of Lake and Adjacent Lakeshore Property

Whitewood Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. It was named for the white-barked trees that grew around its shores. The entire shoreline is privately owned with the exception of a lake access area owned by The South Dakota Department of Game, Fish, and Parks (GFP) on the southwest corner of the lake and some Kingsbury County road right-of-way on the south end.

Fishing Access

The Whitewood Lake Access Area has a single lane boat ramp, dock, parking lot, and public toilet. Shore fishing is available in the access area and along the county road right-of-way. Whitewood is a very popular ice fishing lake, but typically receives little use during the open water season.

Field Observations of Water Quality and Aquatic Vegetation

The water in Whitewood Lake was less turbid than usual with a Secchi depth of 61 cm (24 in). Sago pondweed (*Potamageton pectinatus*) was observed throughout the lake.

BIOLOGICAL DATA

Methods:

Whitewood Lake was sampled on August 3-4, 2010 with three overnight gill net sets and five overnight trap net sets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting. Sampling sites are displayed in Figure 2.

Results and Discussion:

Gill Net Catch

Common carp (72.1%) and yellow perch (19.1%), were the most common species sampled in the gill nets (Table 1). Northern pike and black bullhead were also present.

Table 1. Total catch from three overnight gill net sets at Whitewood Lake, Kingsbury County, August 3-4, 2010.

Species	Number	Percent	CPUE[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Common Carp	49	72.1	16.3	±8.1	23.2	--	--	--
Yellow Perch	13	19.1	4.3	±2.3	82.3	78	44	105
Northern Pike	5	7.4	1.7	±1.5	5.8	--	--	--
Black Bullhead	1	1.5	0.3	±0.4	608.5	--	--	--

* 5 years (2000, 2002, 2004, 2006, 2008)

Table 2. Catch per unit effort by length category for various fish species captured with gill nets in Whitewood Lake August 3-4, 2010.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Common Carp	16.0	0.3	0.3	--	--	16.3	±8.1
Yellow Perch	1.3	3.0	0.7	1.0	1.3	4.3	±2.3
Northern Pike	0.3	1.3	1.3	--	--	1.7	±1.5
Black Bullhead	--	0.3	0.3	--	--	0.3	±0.4

* Length categories can be found in Appendix A.

[1] See Appendix A for definitions of CPUE, PSD, RSD-P, and mean Wr.

Trap Net Catch

Black bullheads (59.4%) comprised the majority of the trap-net sample. Common carp, white sucker, northern pike, yellow perch, and walleye were also caught (Table 3).

Table 3. Total catch from five overnight trap net sets at Whitewood Lake, Kingsbury County, August 3-4, 2010.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	323	59.4	64.6	±36.8	608.5	10	0	107
Common Carp	189	34.7	37.8	±8.7	10.2	84	60	82
White Sucker	22	4.0	4.4	±3.8	32.1	95	68	95
Northern Pike	5	0.9	1.0	±1.0	9.0	--	--	--
Yellow Perch	3	0.6	0.6	±19.7	10.4	--	--	--
Walleye	1	0.2	0.2	±0.3	2.8	--	--	--

* 5 years (2000, 2002, 2004, 2006, 2008)

Table 4. Catch per unit effort by length category for various fish species captured with trap nets in Whitewood Lake August 3-4, 2010.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	14.4	50.2	45.2	5.0	--	64.6	±36.8
Common Carp	23.8	14.0	2.2	3.4	8.4	37.8	±8.7
White Sucker	--	4.4	0.2	1.2	2.6	4.4	±3.8
Northern Pike	--	1.0	0.6	0.4	--	1.0	±1.0
Yellow Perch	--	0.6	0.6	--	--	0.6	±19.7
Walleye	--	0.2	--	--	0.2	0.2	±0.3

* Length categories can be found in Appendix A.

Walleye

Management objectives:
1) To establish and maintain a walleye fishery when the lake is deep enough to support fish life.
2) To rear juvenile and adult walleyes for stocking in other South Dakota waters as needed.

Despite the stocking of 12.5 million walleye fry since 2007 (Table 10), no walleyes were sampled in this year's survey. During the last high-water period of the late 80's and early 90's, a walleye population and fishery was established through fry stocking so the lack of success at this time is disappointing. Further attempts will be made.

Table 5. Walleye gill-net CPUE, PSD, RSD-P and mean Wr for Whitewood Lake, Kingsbury County, 2002-2010.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE	0.0		0.0		0.0		1.7		0.0
PSD	--		--		--		--		--
RSD-P	--		--		--		--		--
Mean Wr	--		--		--		--		--

Yellow Perch

Management objectives:
1) To establish and maintain a yellow perch fishery when the lake is deep enough to support fish life.
2) To rear juvenile and adult yellow perch for stocking in other South Dakota waters as needed.
3) To provide a source of yellow perch eggs for state fish hatchery production.

Yellow perch gill-net CPUE continues to decline (Table 6) as the large year class documented in 2008 exits the population and because there have been no large year classes naturally produced to replace it (Figure 1).

Table 6. Yellow perch gill-net CPUE, PSD, RSD-P and mean Wr for Whitewood Lake, Kingsbury County, 2002-2010.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE	115.3		117.7		62.0		29.7		4.3
PSD	6		97		92		37		78
RSD-P	0		67		50		7		44
Mean Wr	108		92		106		107		105

Northern Pike

Management objective:
1) To establish and maintain a northern pike fishery when the lake is deep enough to support fish life.
2) To rear juvenile and adult northern pike for stocking in other South Dakota waters as needed.

Northern pike trap-net CPUE continues to decline (Table 5), in spite of rising water levels flooding many acres of ideal spawning habitat over the last two years.

Table 7. Northern pike trap-net CPUE, PSD, RSD-P and mean Wr for Whitewood Lake, Kingsbury County, 2002-2010.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE	17.1		14.4		5.0		3.0		1.0
PSD	52		80		66		20		--
RSD-P	10		3		10		13		--
Mean Wr	93		82		93		88		--

Black Bullhead

Bullhead abundance has steadily declined since 2004 (Table 6). The majority (90%) of bullheads sampled this year were under 23 cm (9 in) long (Figure 3).

Table 8. Black bullhead trap-net CPUE, PSD, RSD-P and mean Wr in Whitewood Lake, Kingsbury County, 2002-2010.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
CPUE	398.6		823.2		170.7		75.0		64.6
PSD	5		3		31		13		10
RSD-P	0		0		1		0		0
Mean Wr	91		82		79		90		107

All Species

Partial winterkills and the lack of successful natural recruitment have reduced the abundance of most fish species in Whitewood Lake (Table 9). Hopefully, gamefish populations will rebound through a combination of stocking and natural reproduction during the current high water period.

Table 9. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in Lake Whitewood, Kingsbury County, 2002-2010.

Species	2002	2003	2004	2005	2006	2007	2008	2009	2010
COC (GN)	19.7		10.3		62.5		20.0		16.3
COC (TN)	10.6		5.2		17.5		4.8		37.8
WHS (GN)	9.7		11.0		0.5		2.0		--
WHS (TN)	87.7		32.4		27.7		3.6		4.4
BIB (GN)	0.3		--		--		--		--
BIB (TN)	0.1		0.2		--		--		--
BLB (GN)	81.7		86.0		30.5		14.3		0.3
BLB (TN)	398.6		823.2		170.7		75.0		64.6
NOP (GN)	13.7		0.3		3.5		7.3		1.7
NOP (TN)	17.1		14.4		5.0		3.0		1.0
BLC (GN)	2.7		--		--		--		--
BLC (TN)	6.3		2.0		--		--		0.2
YEP (GN)	115.3		117.7		62.0		29.7		4.3
YEP (TN)	5.4		8.6		5.1		26.6		0.6
WAE (GN)	--		--		--		1.7		--
WAE (TN)	1.1		--		--		1.0		0.2

COC (Common Carp), WHS (White Sucker), BIB (Bigmouth Buffalo), BLB (Black Bullhead), NOP (Northern Pike), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye).

MANAGEMENT RECOMMENDATIONS

1. Whitewood Lake is a shallow, marginal lake subject to frequent winterkills. Management efforts will involve stocking northern pike, yellow perch and walleye as needed to maintain populations, monitoring fish populations to provide information for anglers and using the lake as a source of eggs for hatchery production or fish for restocking in other waters.

Table 10. Stocking record for Whitewood Lake, Kingsbury County, 1986-2010.

Year	Number	Species	Size
1986	2,500,000	Walleye	Fry
	1,920,000	Northern Pike	Fry
	3,960	Black Crappie	Adult
1987	2,500,000	Walleye	Fry
1992	1,250,000	Northern Pike	Fry
	11,500	Northern Pike	Fry
	2,527,000	Walleye	Fry
1994	2,500,000	Walleye	Fry
1997	7,244,000	Walleye	Fry
	4,230	Yellow Perch	Adult
1998	4,970,000	Walleye	Fry
2001	5,000,000	Walleye	Fry
2007	5,000,000	Walleye	Fry
2009	5,000,000	Walleye	Fry
2010	2,500,000	Walleye	Fry

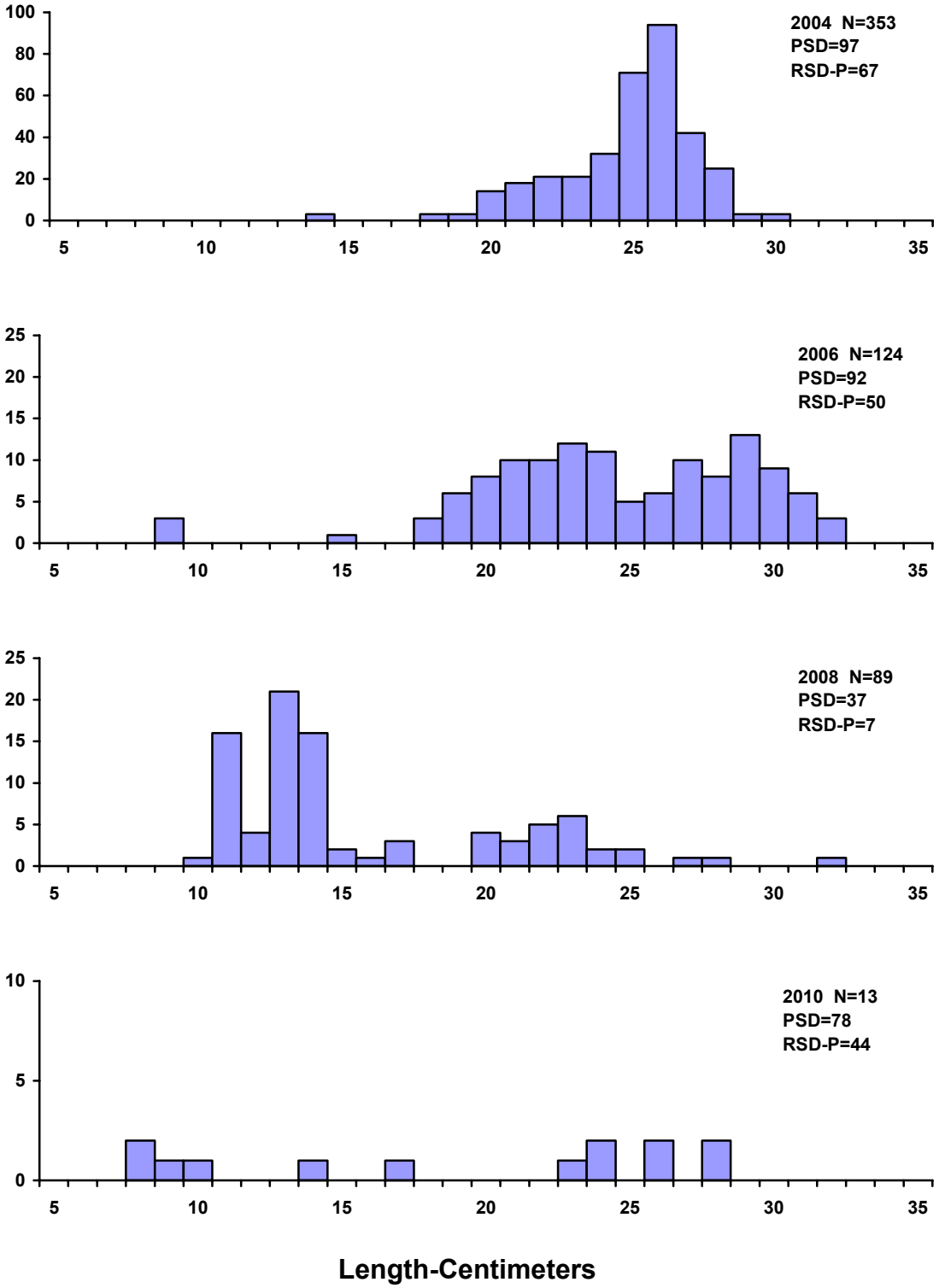

Figure 1. Length frequency histograms for yellow perch sampled with gill nets in Whitewood Lake, Kingsbury County, 2004, 2006, 2008, and 2010.

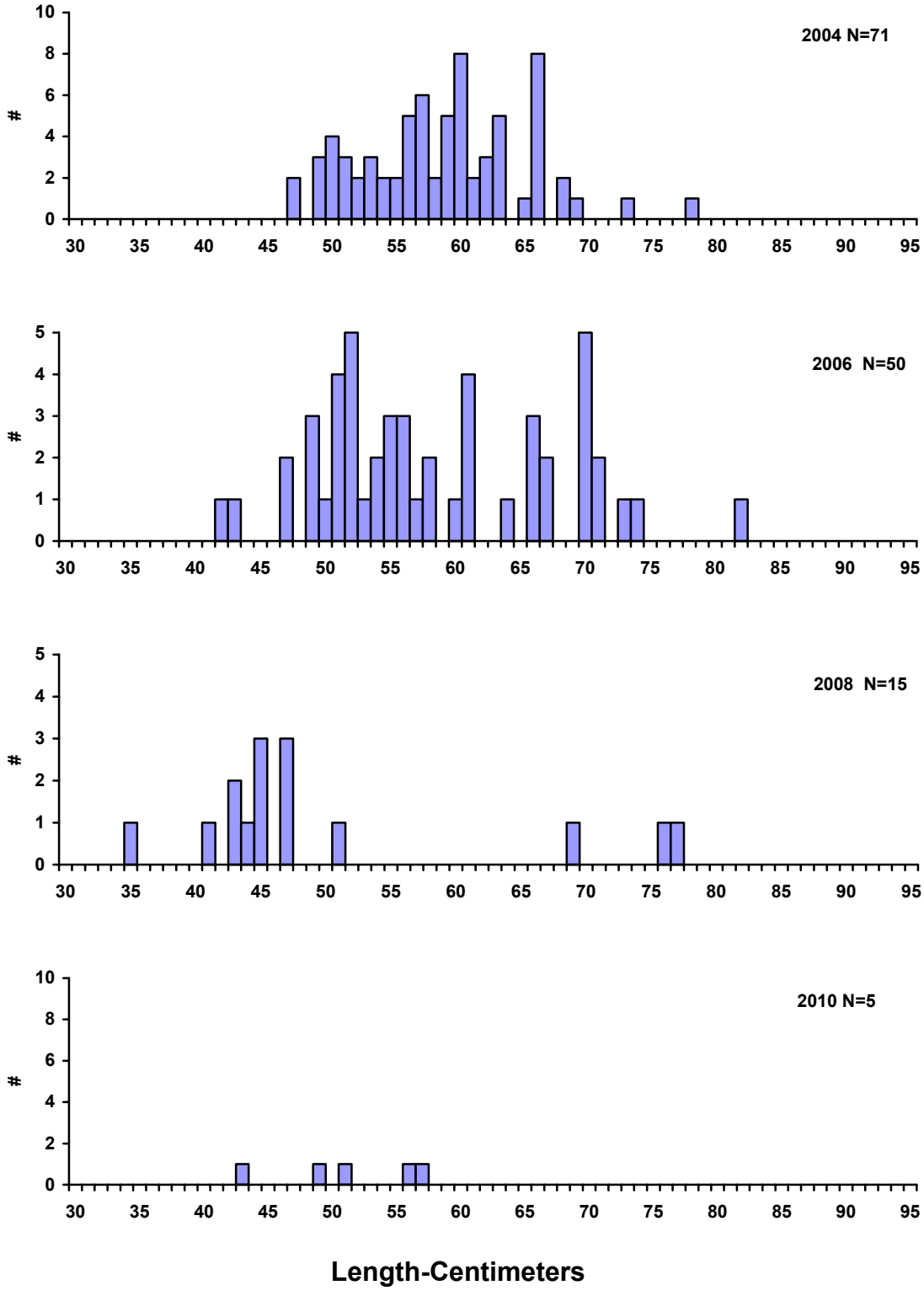

Figure 2. Length frequency histograms for northern pike sampled with trap nets in Lake Thompson, Kingsbury County, 2004, 2006, 2008, and 2010.

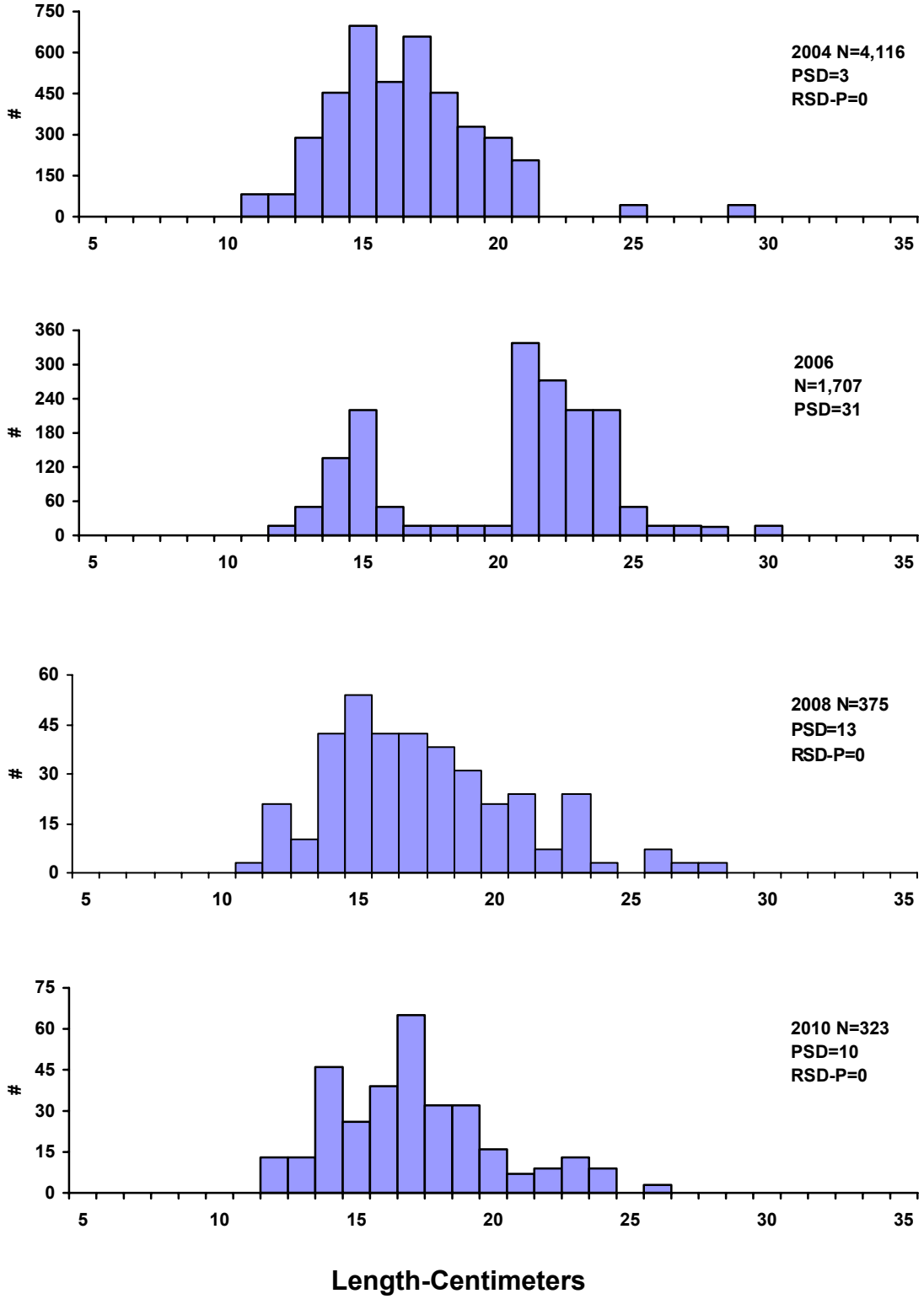

Figure 3. Length frequency histograms for black bullhead sampled with trap nets in Whitewood Lake, Kingsbury County, 2004, 2006, 2008, and 2010.

Legend Trap-Net Sites: T
Gill Net Sites: G

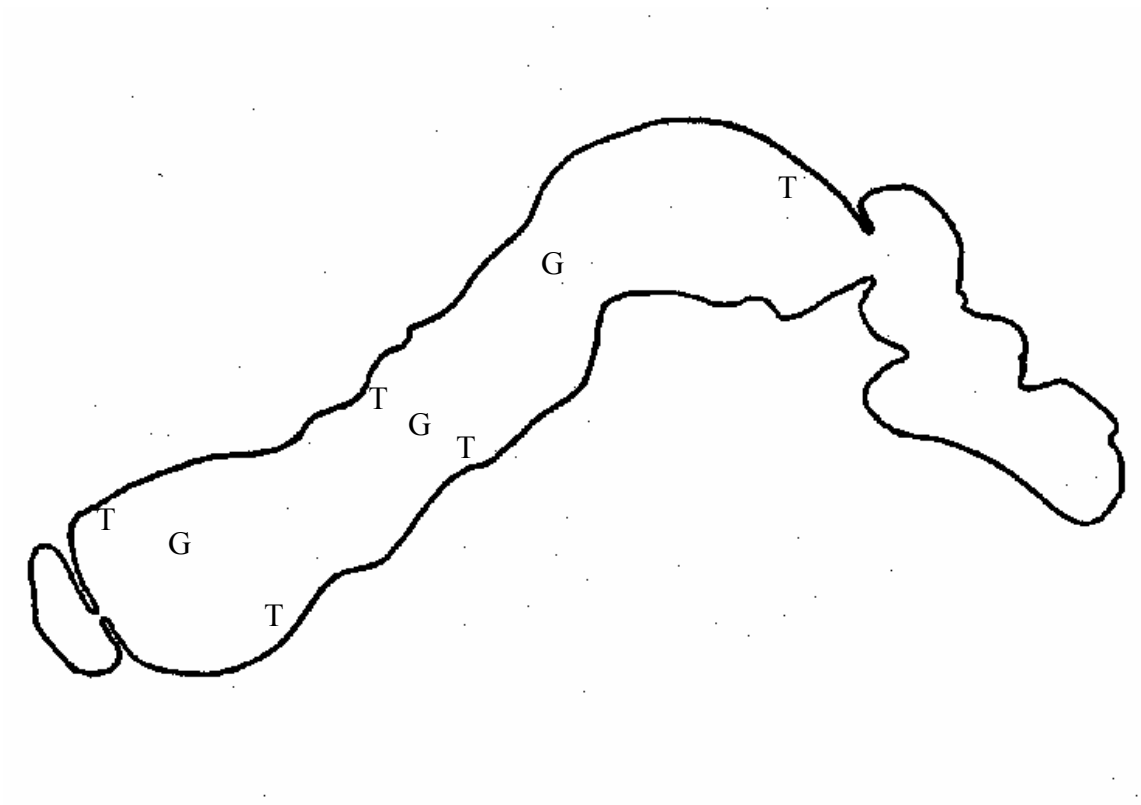

Figure 4. Sampling locations on Whitewood Lake, Kingsbury County, 2010.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.